

REDISCOVERY OF BOTH SEXES OF THE ENIGMATIC
ZOPHINA EISENI (TOWNSEND) (DIPTERA: TABANIDAE) IN
BAJA CALIFORNIA SUR¹

SIXTO COSCARON, G. B. FAIRCHILD, AND C. B. PHILIP

(SC) Universidad Nacional de la Plata, Facultad de Ciencias Naturales y Museo, Paseo del Bosque, La Plata, Argentina; (GBF) Department of Entomology and Nematology, University of Florida, Gainesville, Florida 32611; (CBP) California Academy of Sciences, Golden Gate Park, San Francisco, California 94118.

Abstract.—The little-known tabanid fly *Zophina eiseni* (Townsend) is re-described and figured. It is placed in the primitive section of the Pangoniini and appears nearest *Asaphomyia* and *Protosilvius*.

Dr. Gustav Eisen, a vigorous collector of insects in southern Baja California before the turn of the century, took in September a "wholly blackish" male fly of what Townsend (1895) described as "*Apatolestes* (or nov. gen.) *eiseni*." His guess at that time, based on the male, was remarkably good. As recounted by Philip (1954), Townsend, in later unpublished manuscript notes, decided this fly belonged in a new genus, to which Philip gave the name *Zophina*. Its relationships among generalized Pangoniinae still remained enigmatic, however, because of the unfortunate destruction of the type in the California Academy of Sciences during the great San Francisco earthquake and fire in 1906.

Townsend had received, from Eisen, three more topotypic specimens, including a "poorly preserved" female but only one badly pest-damaged male survived among Townsend's collection. This specimen, now in the British Museum (Natural History) was adequate only for meager generic characterization on further study by Philip (1954). He later made a special trip in September 1972 to the type-locality, San José del Cabo, in an effort to secure additional specimens. He was not successful, although both a net and canopy trap were used, probably because the places of search were in conventional tabanid habitats, such as meadows occupied by livestock, and in vegetation along a nearby stream. It was a gratifying surprise when each

¹ Florida Agricultural Experiment Station Journal Series No. 1285.

sex was recently taken by others (incidental to other insect collecting) in the vicinity of San José del Cabo, again in September, which enabled the present definitive studies. Dr. J. A. Chemsak of the University of California, Berkeley, netted two males while collecting cerambycid beetles, one 3 km N of town. A female was taken by Dr. R. L. Westcott about 10 km SW of town; he reported it to us as resting in a xerophytic bush in the dune area bordering the sandy beach where he also was collecting beetles. The fly was not teneral, but appeared fresh as though recently emerged from below the bush, and resting before taking wing. Townsend's "poorly preserved" female may have been teneral after capture under similar circumstances. We are indebted to Drs. Chemsak and L. L. Pechuman of Cornell University for the loan of these specimens.

The descriptions below confirm the primitive relationship in Tribe Panonini, discussed in detail following the formal description.

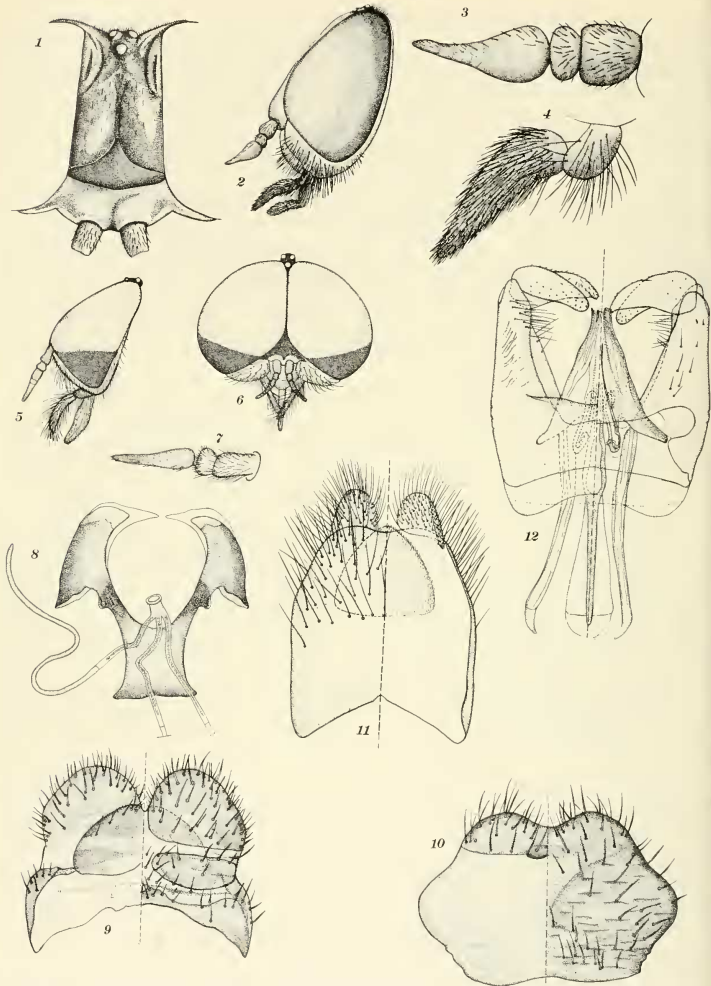
Zophina eiseni (Townsend)

Female.—Length of body 10.5 mm; of wing, 8.5 mm. Eyes bare, iridescent greenish violet, unbanded. Frons (Fig. 1) slightly widened below, index (height/basal width) 1.7, blackish subshiny, with 3 large ocelli at vertex, basal callus black, wide and flat, not well-differentiated from the dark frons; subcallus shiny black and bare. Antennae, palpi and face brownish-gray pollinose with black hairs, the latter very dense on palpi. Proboscis short and membranous, without sclerotized reinforcements. Face short, profile of head as figured (Fig. 2). Scape robust, little longer than wide; pedicel longer than $\frac{1}{2}$ its own width. Style composed of a basal plate and 5 annuli, sutures between the segments indistinct (Fig. 3). Second palpal segment elongated, without bare areas or sensorial pits (Fig. 4).

Thorax and abdomen dark brownish without ornamentation. Wings blackish with very short appendix on R_4 . Legs blackish brown with black hairs. Posterior tibiae with 2 short apical spurs.

Genitalia.—Cerci subtriangular with apical borders rounded, tergite X divided, with few setae, and tergite IX undivided, hypoproct with sparse subapical setae (Fig. 9). Sternite VIII wider than long with apical margin excavated, gonapophyses well-sclerotized (Fig. 10). Genital fork without teeth on the combs and straight basally. Basal portion of spermathecal ducts with small but evident chitinous thickenings, though without mushroom-like expansions; distal portions of spermathecal ducts with membranous ampullae, not sclerotized nor expanded (Fig. 8).

Male.—Similar in size and coloration to the ♀. Head with area of enlarged facets covering most of eye surface, bare, and with very large ommatidia (Figs. 5, 6). Ocellar tubercle higher than eyes, the 3 ocelli well-developed; frontal triangle black, shiny. Antennae (Fig. 7) grayish brown, the styles paler; whole antenna more slender than in ♀, with scape 2× as long as wide



Figs. 1-12. *Zophina eiseni*. 1, Frons of ♀. 2, Head, ♀, lateral view. 3, Antenna, ♀. 4, Left palpus, ♀. 5, Head, ♂, lateral view. 6, Head, ♂, frontal view. 7, Antenna, ♂. 8, ♀, genital fork and spermatheca. 9, ♀, tergites IX-X and hypoproct. 10, ♀, sternite VIII and gonapophyses. 11, ♂, tergite IX, cerci and hypoproct. 12, ♂, basistyle, dististyle and aedeagus.

and style with basal plate more slender, the 5 to 7 segments of style not clearly demarcated. Palpi more slender than in female, its shape obscured by dense hairs.

Genitalia.—Basistyle inwardly concave, dististyle strongly bifid; aedeagus robust, subtriangular (Fig. 12). Cerci subcircular, tergite IX undivided, shield-shaped, with a deep basal concavity; hypoproct subtriangular (Fig. 11).

Specimens examined.—Mexico, Baja California Sur, San José del Cabo, 11–12 September 1967, coll. J. A. Chemsak, 1 ♂; 3 km N San José del Cabo, 11–13 September 1967, coll. Chemsak, 1 ♂; 6.5 mi (10 km) SW San José del Cabo, 22 September 1976, coll. R. L. Westcott, 1 ♀.

Discussion.—The following characters show that this species belongs in Pangoniinae: ♂, tergite IX a single shield, dististyle bifid. Female, tergite IX undivided, basal portion of spermathecal ducts without mushroom-shaped expansions distally, sternite VIII very wide medially with a deep concavity on the distal margin. Within the Pangoniinae it fits best in the Tribe Pangoniini, as it has dististyle bifid, ocelli present, proboscis short and basal annulations of antennal flagellum partially (♂) or entirely fused (♀). The appendix on fork of R_4 is short in the female, absent in the males. The presence of enlarged and bare upper eye facets in the ♂ is a very peculiar character, uncommon in Pangoniini. The palpi are as in *Veprius presbiter* Rondani and *Protodasyapha hirtuosa* (Philippi) without special sensorial areas such as found on the apical portion in *Stonemyia tranquilla* (Osten Sacken), *Protodasyapha (Curumyia) lugens* (Philippi) or *Apatolestes* spp., or special pits as in *Chaetopalpus annulicornis* Philippi, *Fairchildimyia penai* Coscaron and Philip or *Brennania hera* (Osten Sacken). The closest genus structurally appears to be *Asaphomyia* Stone. *Asaphomyia texensis* Stone, illustrated by Stone (1953) and the genitalia by Mackerras (1955:463), differs slightly in the shapes of the ♀ sternite VIII and ♂ tergite IX, and more noticeably in the shape of the antennae, which in *A. texensis* has an orbicular or disc-shaped basal plate and slender, abruptly narrowed flagellum of 2 or 3 poorly demarcated, elongate annuli. In *A. floridensis* Pechuman (1974), the styles of the ♂ genitalia are more deeply bifid, the ventral ramus being more hooked. The antennae of *A. floridensis* are similar to those of *A. texensis* and both species share with *Zophina* the bare, enlarged upper eye facets and lack of palpal sensory areas in the male.

Apatolestes spp. are very close in most features of the genitalia, but the cerci are more acute, the frons is more swollen basally, and the palpi have apical sensory areas.

Protosilvius as treated by Fairchild (1962), also contains species, such as *priscus* Fairchild and perhaps *termitiformis* Enderlein, which have a number of features in common with both *Asaphomyia* and *Zophina*, such as bare, enlarged upper eye facets in ♂ *priscus*, antennae somewhat interme-

diate in structure between *Asaphomyia* and *Zophina*, and δ genitalia of at least *priscus* and *mackerrasi* quite similar to those of *Zophina*. The structure of the spermathecae, so far as known, is rather different in *Protosilvius*, and none of the species has as broad a frons as *Zophina* or *Asaphomyia*, nor any vestige of a frontal callus.

The Nearctic genera *Brennania*, *Stonemyia*, and *Pilimas* are less similar, differing notably in both genitalic and external features.

It is obvious that this group of generalized genera has much in common, and their disjunct, mainly subtropical distribution further suggests that all may represent an earlier stage in the development of the Pangoniinae, as was postulated by Mackerras (1955). We believe that a more detailed comparative study of the structure of not only *Zophina*, *Asaphomyia*, *Apatolestes*, and *Protosilvius*, but including also such genera as *Ectenopsis* (Australia) and the group of southern Neotropical genera recently discussed by Coscaron (1976) should be undertaken. There appears to have been much more recognition of differences among this group in the New World, about 13 supraspecific categories versus about six in the Australian region, and a reassessment of the characters used to separate these taxa seems in order.

LITERATURE CITED

- Coscaron, S. 1976. Contribucion al conocimiento de los Tabanidae Neotropicales. II. Los Pangoniini del Sur de sudamerica y datos sobre la tribu Scepsidini. Rev. Mus. de la Plata (N.S.) 12, Sec. Zool. No. 114, p. 75-116.
- Fairchild, G. B. 1962. Notes on Neotropical Tabanidae. III. The genus *Protosilvius* Enderlein. Ann. Entomol. Soc. Am. 55(3):342-350.
- Mackerras, I. M. 1955. The classification and distribution of Tabanidae. II. History: Morphology: Classification: Subfamily Pangoniinae. Australian J. Zool. 3(3):439-511.
- Pechuman, L. L. 1974. Two new Tabanidae from southeastern United States. J. NY Entomol. Soc. 82(3):183-188.
- Philip, C. B. 1954. New North American Tabanidae. IV. *Zophina* new genus for "*Apatolestes*" *eiseni* Townsend from Lower California. Pan-Pac. Entomol. 30:53-56.
- Stone, A. 1953. New tabanid flies of the tribe Merycomyiini, J. Wash. Acad. Sci. 43(8):255-258.
- Townsend, C. H. T. 1895. On the Diptera of Baja California, including some species from adjacent regions. Proc. Calif. Acad. Sci. (ser. 2). 4:593-620.